

Title: GROUP A STREPTOCOCCAL VACCINES

Express Mail No. EV170136572US

Inventor(s): James B. Dale

Serial No. 09/151,409

Docket No. 481112.410

APPROVED		O.G. FIG.	
BY		CLASS	SUBCLASS
DRAFTSMAN			

SphI	BamHI	Sall	NcoI	PstI	KpnI	ClaI	HindIII
5'	M24	M5	M6	M19	M1.0	M3	M24
	60 Codons	58 Codons	35 Codons ea.	50 Codons	50 Codons	80 Codons	80 Codons
							3'

Fig. 1

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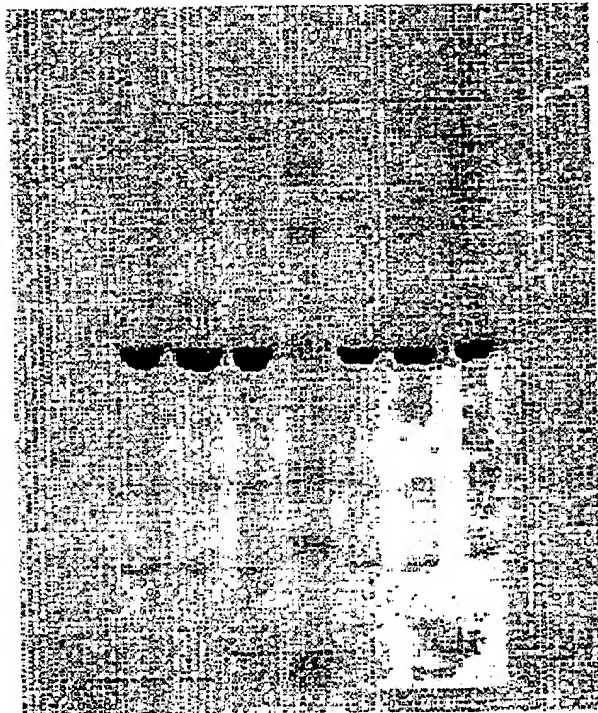
Docket No. 481112.410

10/17/02

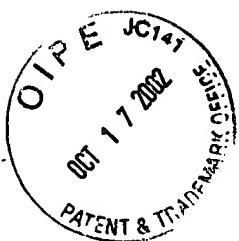


30853 U.S. PTO

O.G. FIG.	SUBCLASS
	CLASS
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*Fig. 2*



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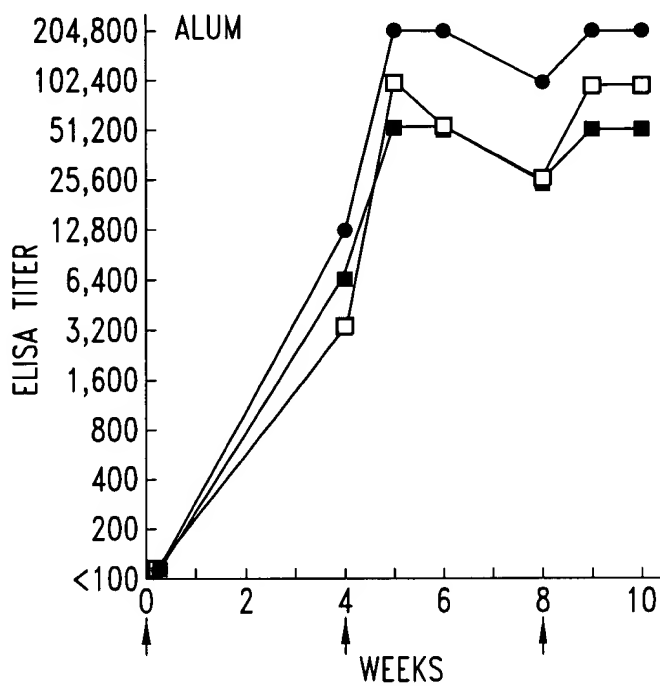
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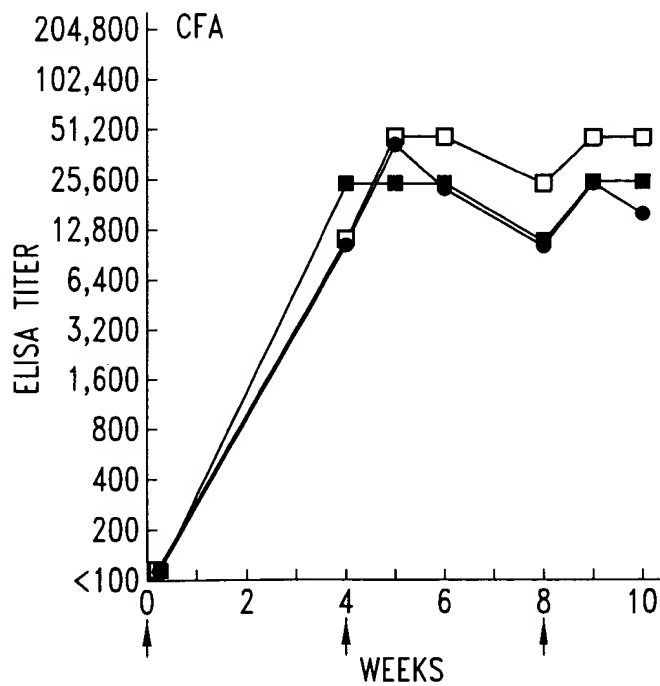
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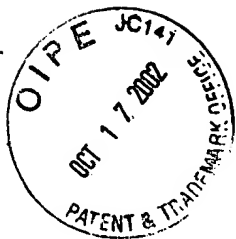
APPROVED	O.G. FIG.	SUBCLASS
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*Fig. 3A*



*Fig. 3B*



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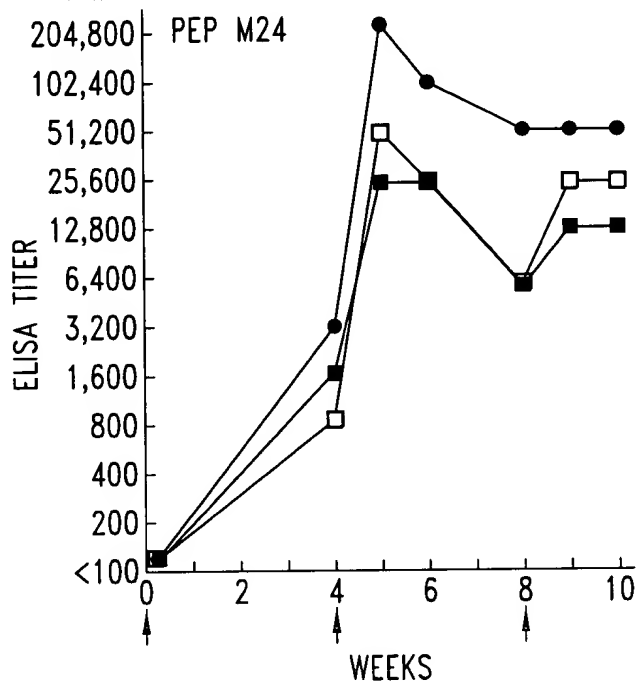
Express Mail No. EV170136572US

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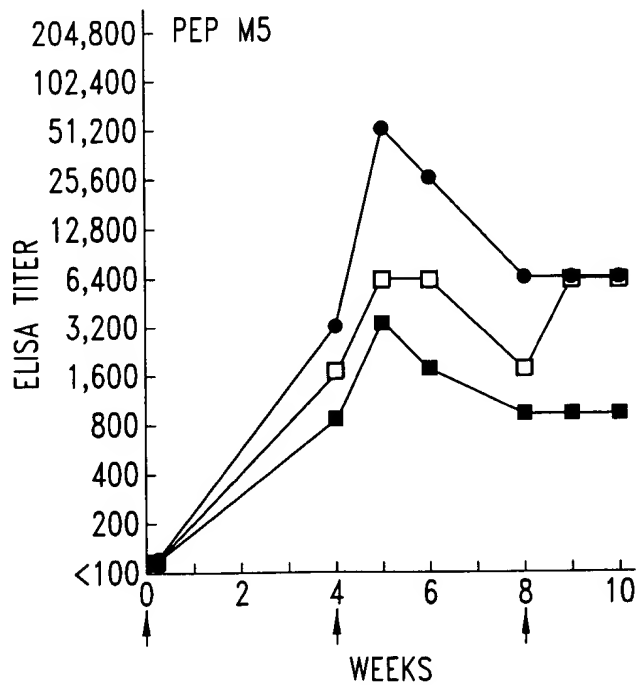
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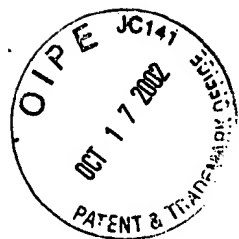
O.G. FIG.		SUBCLASS	
CLASS			
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*Fig. 4A*



*Fig. 4B*



Title: GROUP A STREPTOCOCCAL VACCINES

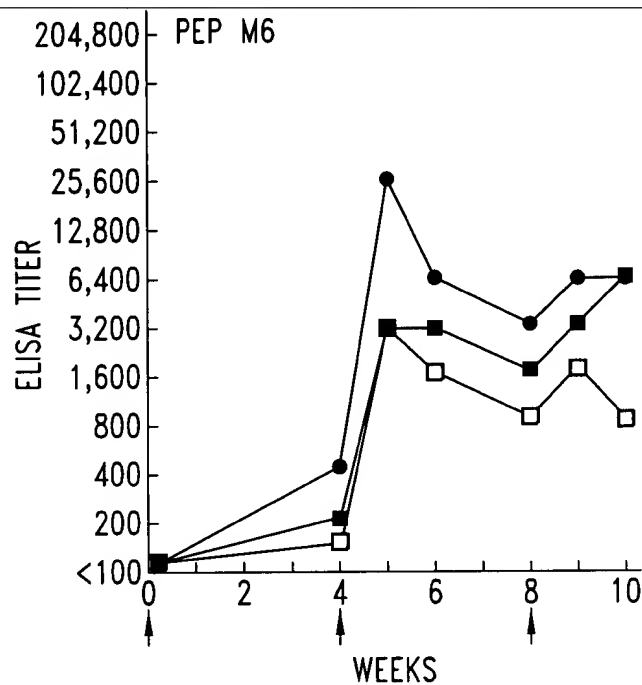
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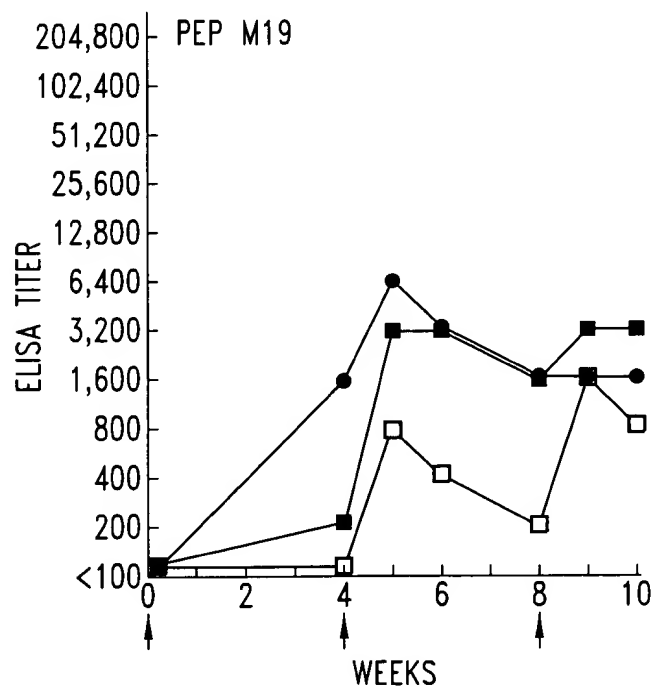
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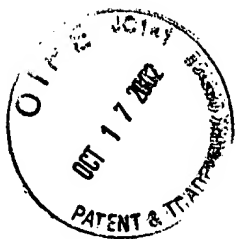
APPROVED BY DRAFTSMAN	Q.G. FIG.	
	CLASS	SUBCLASS



*Fig. 4C*



*Fig. 4D*



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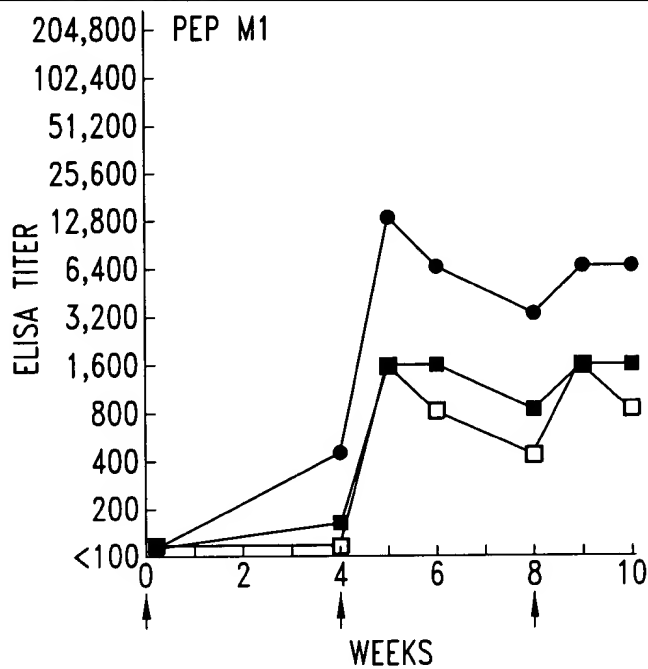
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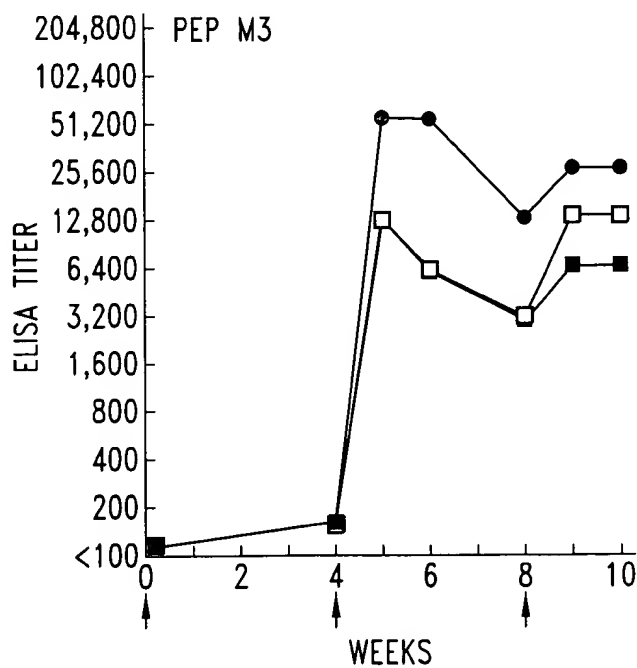
Serial No. 09/151,409

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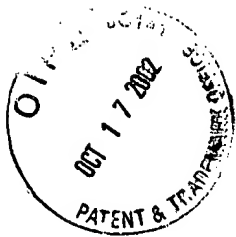
APPROVED BY DRAFTSMAN	O.G. FIG.	
	CLASS	SUBCLASS



*Fig. 4E*



*Fig. 4F*



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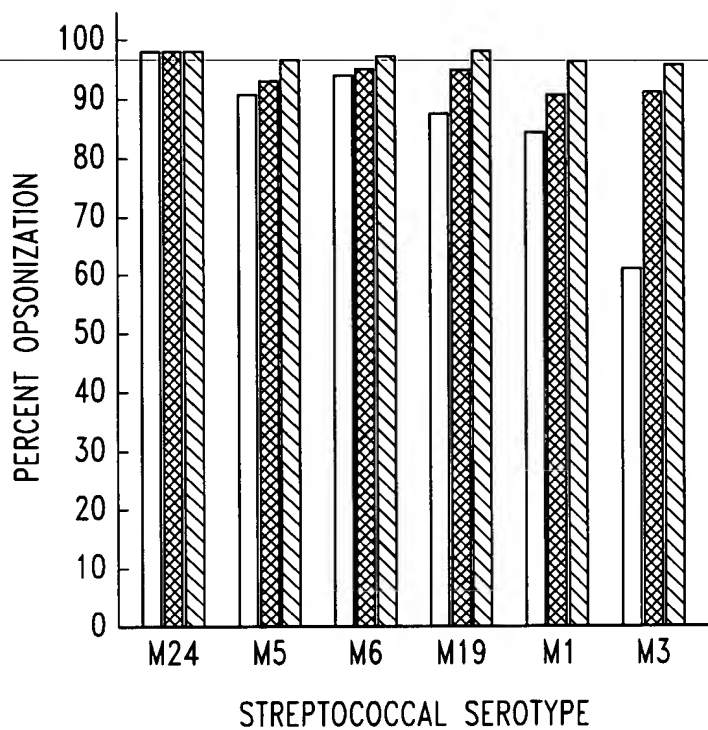
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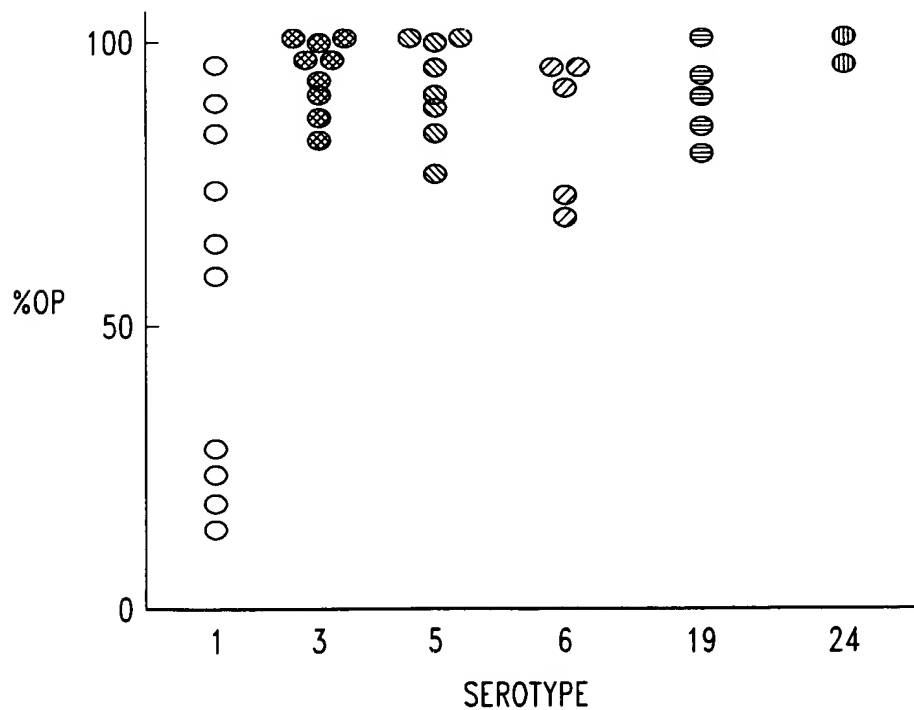
Serial No. 09/151,409

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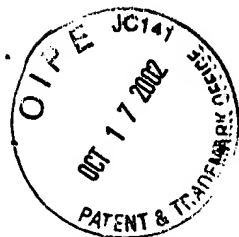
APPROVED BY DRAFTSMAN	O.G. FIG.	
	CLASS	SUBCLASS



*Fig. 5*



*Fig. 6*



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## HEXAVALENT M.PROTEIN VACCINE SEQUENCE

O.G. FIG.	SUBCLASS
	CLASS
APPROVED BY	DRAFTSMAN

10 20 30 40 50 60 70  
\* \* \* \* \*  
GCA TGC ATG GTC GCG ACT AGG TCT CAG ACA GAT ACT CTG GAA AAA GTA CAA GAA CGT CCT GAC AAG TTT GAG ATA  
Ala Cys Met Val Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val Gln Glu Arg Ala Asp Lys Phe Glu Ile  
-SphI- M24----->

80 90 100 110 120 130 140 150  
\* \* \* \* \*  
GAA AAC AAT ACG TTA AAA CTT AAG AAT AGT GAC TTA AGT TTT AAT AAT AAA GCG TTA AAA GAT CAT AAT GAT GAG  
Glu Asn Asn Thr Leu Lys Leu Lys Asn Ser Asp Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn Asp Glu

160 170 180 190 200 210 220  
\* \* \* \* \*  
TTA ACT GAA GAG TTG AGT AAT GCT AAA GAG AAA CTA CGT GGA TCC GCC GTG ACT AGG CGT ACA ATA AAT GAC CCG  
Leu Thr Glu Glu Leu Ser Asn Ala Lys Glu Lys Leu Arg Gly Ser Ala Val Thr Arg Gly Thr Ile Asn Asp Pro  
-BamHI- M5----->

230 240 250 260 270 280 290 300  
\* \* \* \* \*  
CAA AGA GCA AAA GAA GCT CTT GAC AAG TAT GAG CTA GAA AAC CAT GAC TTA AAA ACT AAG AAT GAA GGG TTA AAA  
Gln Arg Ala Lys Glu Ala Leu Asp Lys Tyr Glu Leu Glu Asn His Asp Leu Lys Thr Lys Asn Glu Gly Leu Lys

310 320 330 340 350 360 370  
\* \* \* \* \*  
ACT GAG AAT GAA GGG TTA AAA ACT GAG AAT GAA GGG TTA AAA ACT GAG AAT GAA GGG TTA AAA ACT GAG GTC GAC  
Thr Glu Asn Glu Gly Leu Lys Thr Glu Asn Glu Gly Leu Lys Thr Glu Asn Glu Gly Leu Lys Thr Glu Val Asp  
-SalI-

380 390 400 410 420 430 440 450  
\* \* \* \* \*  
AGA GTG TTT CCT AGG GGG ACG GTA GAA AAC CCG GAC AAA GCA CGA GAA CTT CTT AAC AAG TAT GAC GTA GAG AAC  
Arg Val Phe Pro Arg Gly Thr Val Glu Asn Pro Asp Lys Ala Arg Glu Leu Leu Asn Lys Tyr Asp Val Glu Asn  
M6----->

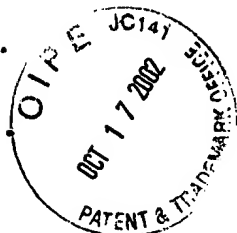
460 470 480 490 500 510 520  
\* \* \* \* \*  
TCT ATG TTA CAA GCT AAT AAT GAC AAG TTA CCA TGG AGA GTG CGT TAT ACT AGG CAT ACG CCA GAA GAT AAG CTA  
Ser Met Leu Gln Ala Asn Asn Asp Lys Leu Pro Trp Arg Val Arg Tyr Thr Arg His Thr Pro Glu Asp Lys Leu  
-NcoI- M19----->

530 540 550 560 570 580 590 600  
\* \* \* \* \*  
AAA AAA ATT ATT GAC GAT CTT GAC GCA AAA GAA CAT GAA TTA CAA CAA CAG AAT GAG AAG TTA TCT CTG CAG AAC  
Lys Lys Ile Ile Asp Asp Leu Asp Ala Lys Glu His Glu Leu Gln Gln Asn Glu Lys Leu Ser Leu Gln Asn  
-PstI- M1.0

610 620 630 640 650 660 670  
\* \* \* \* \*  
GGT GAT GGT AAT CCT AGG GAA GTT ATA GAA GAT CTT GCA GCA AAC AAT CCC GCA ATA CAA AAT ATA CGT TTA CGT  
Gly Asp Gly Asn Pro Arg Glu Val Ile Glu Asp Leu Ala Ala Asn Asn Pro Ala Ile Gln Asn Ile Arg Leu Arg  
----->

Fig. 7A





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O.G. FIG.	SUBCLASS
	CLASS
APPROVED BY DRAFTSMAN	

680      690      700      710      720      730      740      750  
\*      \*      \*      \*      \*      \*      \*      \*  
CAC GAA AAC AAG GAC TTA AAA GCG AGA TTA GAG AAT GCA ATG GAA GTT GCA GGA AGA GAT TTT AAG AGA GCT GGT  
His Glu Asn Lys Asp Leu Lys Ala Arg Leu Glu Asn Ala Met Glu Val Ala Gly Arg Asp Phe Lys Arg Ala Gly  
KpnI

760      770      780      790      800      810      820  
\*      \*      \*      \*      \*      \*      \*  
ACC TTG TTA GAT CAG GTT ACA CAA TTA TAT ACT AAA CAT AAT AGT AAT TAC CAA CAA TAT AAT GCA CAA GCT GGC  
Thr Leu Leu Asp Gln Val Thr Gln Leu Tyr Thr Lys His Asn Ser Asn Tyr Gln Gln Tyr Asn Ala Gln Ala Gly  
--- M3----->

830      840      850      860      870      880      890      900  
\*      \*      \*      \*      \*      \*      \*      \*  
AGA CTT GAC CTG AGA CAA AAG GCT GAA TAT CTA AAA GGC CTT AAT GAT TGG GCT GAG AGG CTG TTA CAA GAG TTA  
Arg Leu Asp Leu Arg Gln Lys Ala Glu Tyr Leu Lys Gly Leu Asn Asp Trp Ala Glu Arg Leu Leu Gln Glu Leu

910      920      930      940      950      960      970  
\*      \*      \*      \*      \*      \*      \*  
AAT ATC GAT GTC GCG ACT AGG TCT CAG ACA GAT ACT CTG GAA AAA GTA CAA GAA CGT GCT GAC AAG TTT GAG ATA  
Asn Ile Asp Val Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val Gln Glu Arg Ala Asp Lys Phe Glu Ile  
-ClaI- M24----->

980      990      1000      1010      1020      1030      1040      1050  
\*      \*      \*      \*      \*      \*      \*      \*  
GAA AAC AAT ACG TTA AAA CTT AAG AAT AGT GAC TTA AGT TTT AAT AAT AAA GCG TTA AAA GAT CAT AAT GAT GAG  
Glu Asn Asn Thr Leu Lys Leu Lys Asn Ser Asp Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn Asp Glu

1060      1070      1080      1090      1100      1110      1120  
\*      \*      \*      \*      \*      \*      \*  
TTA ACT GAA GAG TTG AGT AAT GCT AAA GAG AAA CTA CGT AAA AAT GAT AAA TCA CTA TCT GAA AAA GCT AGT AAA  
Leu Thr Glu Glu Leu Ser Asn Ala Lys Glu Lys Leu Arg Lys Asn Asp Lys Ser Leu Ser Glu Lys Ala Ser Lys

1130      1140      1150  
\*      \*      \*      \*      \*      \*  
ATT CAA GAA TTA GAG GCA CGT AAG TAA AAG CTT  
Ile Gln Glu Leu Glu Ala Arg Lys \*\*\* Lys Leu  
Stop HindIII

Fig. 7B